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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/008,432	11/13/2001	Zheng Chen	M61.12-0370	3038

27366 7590 06/23/2006

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EXAMINER
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SKED, MATTHEW J

ART UNIT	PAPER NUMBER
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2626

DATE MAILED: 06/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/008,432	CHEN ET AL.	
	Examiner	Art Unit	
	Matthew J. Sked	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 07 April 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Response to Amendment*

1. Applicant's arguments with respect to claims 1-12 and 22 have been considered but are moot in view of the new ground(s) of rejection, necessitated by amendment.

2. Applicant's arguments, in regards to claims 13-21, filed 4/7/06 have been fully considered but they are not persuasive. Specifically, Applicant argues that neither reference teaches, "setting a probability of an entity given a class based on at least one of a decoded entity and a modified entity". The Examiner respectfully disagrees.

Roberts (U.S. Pat. 5,765,132) teaches a system for adapting a probabilistic speech recognition vocabulary using a modified entity (col. 4, lines 41-51, col. 5, lines 11-21 and col. 8, lines 4-9). The only limitation that Roberts does not teach is that the probabilistic dictionary is not class based. Witschel (U.S. Pat. Pub. 2001/0051868A1) is relied upon to demonstrate that class-based vocabularies are well known in the art. Witschel even suggests that the probability of a word given a class should be adapted for new words (paragraph 112, 113 and 155). The fact that Witschel does not teach that these new words are "at least one of a decoded entity and a modified entity" is irrelevant since Roberts already teaches this limitation. The system of Witschel would recalculate the probabilities of the words given the class for all delivered new words to the adaptation module whether these words are unmodified text, as asserted by the Applicant, or modified words from the system of Roberts.

The rejection stands.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-5, 8 and 10-12 rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (U.S. Pat. 6,067,520) in view of Witschel (U.S. Pat Pub. 2001/0051868A1).

As per claim 1, Lee teaches a method of decoding input, the method comprising:  
identifying possible sequences of words from the input; using a language model and an entity dictionary to select one of the possible sequences of words as an output sequence (uses a class-based dictionary and language model to detect the most likely word string from the user's input speech, col. 5, lines 12-16, 32-64 and col. 12 line 50 to col. 13, line 37);

receiving modifications made to the output sequence (user corrects output characters, col. 5, line 65 to col. 6, line 12); and

using the modifications to change the entity dictionary (corrects the contents of the dictionary based upon the user corrections, col. 5, line 65 to col. 6, line 12).

Lee does not specifically state that the class-entity dictionary providing the probability of an entity given a class.

Witschel teaches a system for adapting language models that teaches the vocabulary is class-based wherein the vocabulary provides the probability of a word

given a class and suggests adapting these probabilities for new words (paragraph 112, 113 and 155).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the system of Roberts so the entity dictionary is class-based and the probability providing the probability of the entity given a class as taught by Witschel because it would enable easier retrieval of words during recognition once a class is determined.

5. As per claim 2, Lee teaches that using the modifications to change the entity dictionary comprises using the modifications to add an entity to the entity dictionary (new words added to the lexicon, col. 18, lines 48-64).

6. As per claim 3, Lee teaches adding an entity to the class entity dictionary comprises adding an entity to a class in the class entity dictionary (since the dictionary is class based a newly added word would inherently be placed in a class, col. 18, lines 48-64).

7. As per claim 4, Lee teaches estimating the probability given the class to which the entity is added (updates probabilities of associativity, col. 18, lines 48-64).

8. As per claim 5, Lee teaches receiving a modified entity that represents a modification of a decoded entity in the output sequence and wherein adding an entity comprises adding the modified entity (user correction includes new words that are added to the dictionary, col. 5, line 65 to col. 6, line 12 and col. 18, lines 48-64).

9. As per claims 8, 10 and 12, Lee suggests increasing and decreasing a probability associated with an entity, including the decoded entity, in the entity dictionary

(associativity between characters/words/word classes are updated hence inherently increasing and decreasing the probabilities, col. 18, lines 48-64).

10. As per claim 11, Lee teaches receiving a modified entity that represents a modification of a decoded entity in the output sequence and wherein the modified entity is not found in the entity dictionary but the decoded entity is found in the class entity dictionary (corrects the contents of the dictionary based upon the user corrections where new words added to the lexicon and the decoded entities would inherently be contained in the dictionary in order to be outputted as recognition results, col. 5, line 65 to col. 6, line 12 and col. 18, lines 48-64).

11. Claims 6, 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee in view of Witschel and taken in further view of Hon.

As per claims 6 and 7, Lee and Witschel do not teach estimating a probability based in part on a probability associated with the decoded entity wherein estimating a probability for the entity comprises estimating the probability based on an n-gram probability associated with the decoded entity and an n-gram associated with the class to which the modified entity is added.

Hon teaches a speech recognition system that determines a probability for the modified segment based in part on the decoded segment (determines a difference score between the unrecognized word and the top one candidate and uses this score to update the unrecognized word's probability, col. 7, line 59 to col. 8, line 3 and Fig. 4,

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element 189) and using a n-gram language model hence the probabilities calculated would be based on these n-grams (col. 7, lines 10-27).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the system of Lee and Witschel to estimate estimating a probability based in part on a probability associated with the decoded entity wherein estimating a probability for the entity comprises estimating the probability based on an n-gram probability associated with the decoded entity and an n-gram associated with the class to which the modified entity is added as taught by Hon because it would ensure that the misrecognized word would have a lower probability than the new word hence the new word would be recognized correctly in the next iteration.

12. As per claim 9, Lee and Witschel not teach wherein the modified entity is found in the class entity dictionary.

Hon teaches modifying the outputted text by choosing words from an alternate word list hence the modified entry would be in the dictionary (col. 7, line 59 to col. 8, line 3).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the system of Lee and Witschel to output text by choosing words from an alternate word list hence the modified entry would be in the dictionary as taught by Hon because it would allow the system to not only add new words but make corrections to words currently in the vocabulary hence producing better recognition results.

13. Claims 13-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts (U.S. Pat. 5,765,132) in view of Witschel (U.S. Pat. Pub. 2001/0051868A1).

As per claims 13 and 16, Roberts teaches a computer-readable medium having computer-executable instructions for performing steps comprising:

generating a sequence of words based in part on an entity dictionary that provides probabilities for entities (system generates a recognition result using probabilistic models in a vocabulary, col. 4, lines 41-51 and col. 5, lines 11-21);

receiving a modification to the sequence of words such that a decoded entity in the sequence of words is modified into a modified entity (user modifies the recognition results, col. 5, lines 11-21); and

setting a probability of an entity in the entity dictionary based at least in part on the modified entity (generates a new probabilistic model for the new word and adds it to the vocabulary, col. 8, lines 4-9).

Roberts does not teach the entity dictionary to be class-based and the probability providing the probability of the entity given a class.

Witschel teaches a system for building class-based language models in which the probabilities include the conditional word probability of a word given a class (paragraph 112, 113 and 155).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the system of Roberts so the entity dictionary is class-based and the probability providing the probability of the entity given a class as taught by Witschel



because it would enable easier retrieval of words during recognition once a class is determined.

14. As per claim 14, Roberts teaches adding the modified entity to the entity dictionary and selecting a probability for the modified entry (generates a probabilistic speech model for the new word and adds this model and the new word to the vocabulary, col. 8, lines 4-9 and Fig. 5, element 92).

15. As per claim 15, Roberts suggests estimating the probability based in part on a probability associated with the decoded entity (approximates the syllables that corresponds to the input in order to calculate the model and because the new word would share some of the same syllables as the recognized word the probabilities would be linked by the syllable approximations, col. 6, line 46 to col. 7, line 5).

16. As per claim 17, Roberts does not teach estimating the probability based on an n-gram probability associated with the decoded entity and an n-gram probability associated with the class to which the modified entity is added.

Witschel teaches calculating the probability of the word using bigrams and the class bigram probability (paragraphs 60-70).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the system of Roberts to estimate the probability based on an n-gram probability associated with the decoded entity and an n-gram probability associated with the class to which the modified entity is added as taught by Witschel because this would allow the system to recognize highly probable word strings hence giving better results.

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17. As per claims 18 and 20, Roberts suggests increasing and decreasing a probability associated with an entity in the entity dictionary (new word models are further trained through future utterances of the words hence the probabilities would be changed which would either be an increase or a decrease in the probability, col. 8, lines 28-34).

18. As per claim 19, Roberts teaches receiving a modified entity that represents a modification of a decoded entity in the output sequence and wherein the modified entity is found in the entity dictionary (speech models are further trained after copied into the vocabulary, col. 8, lines 28-34).

19. As per claim 21, Roberts teaches receiving a modified entity that represents a modification of a decoded entity in the output sequence and wherein the modified entity is not found in the entity dictionary but the decoded entity is found in the class entity dictionary (receives a change to the recognized output where the recognized word is in the vocabulary, col. 5, lines 11-21).

20. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hon (U.S. Pat. 5,852,801) in view of Witschel.

Hon teaches a method of adapting a class entity dictionary used with a class-based language model, the method comprising:

receiving a user modification of a sequence of words that were identified based in part on the class-based language model (program includes a speech recognizer and an interface to allow the user to modify the recognized words, col. 6 lines 45-55 and col. 7, lines 29-48);

identifying a decoded segment that has been modified to become a modified segment in the user modification (adds the unrecognized word to the lexicon, col. 7, lines 49-54); and

determining a probability for the modified segment based in part on the decoded segment (determines a difference score between the unrecognized word and the top one candidate and uses this score to update the unrecognized word's probability, col. 7, line 59 to col. 8, line 3 and Fig. 4, element 189).

Hon does not teach determining a probability for the modified segment given a class.

Witschel teaches a system for adapting language models that teaches the vocabulary is class-based wherein the vocabulary provides the probability of a word given a class and suggests adapting these probabilities for new words (paragraph 112, 113 and 155).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the system of Roberts to determine a probability for a segment given a class as taught by Witschel because it would enable easier retrieval of words during recognition once a class is determined.

### ***Conclusion***

21. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kneser et al. (U.S. Pat. 6,157,912) teaches a language model adaptation that uses the probability of a word given a class.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J. Sked whose telephone number is (571) 272-7627. The examiner can normally be reached on Mon-Fri (8:00 am - 4:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Hudspeth can be reached on (571) 272-7843. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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6/14/06



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